

AMENDMENTS TO THE CLAIMS:

1-8 (Cancelled)

9. (Currently Amended) A system for controlling exposure dose in a lithographic exposure tool for exposing a photoresist material applied to semiconductor wafers, and a reticle develops images in the photoresist material applied to the semiconductor wafers, and wherein the photoresist material is subject to batch changeover and the system operates with successive lot runs, including previous lot runs that were run prior in time and a current lot run that is currently being run, comprising:

means for adjusting said exposure dose as a function of resist sensitivity changes, further comprising;

- a) means for calculating a batch factor that is an exposure dose ratio of current exposure dose performance to previous exposure dose performance by using historical data, comprising batch factors and optimum exposure doses from at least one previous lot run that was run prior in time to the ~~previous to a~~ current lot run;
- b) said means for adjusting said exposure dose comprises means for calculating a value of said exposure dose based on said calculated batch factor whereby said exposure dose in said lithographic exposure tool is controlled.

10. (Currently Amended) The system for controlling exposure dose as claimed in Claim 9, wherein said means for adjusting said exposure dose uses ~~further comprises using~~ said optimum exposure doses from said historical data.

11. (Currently Amended) The system for controlling exposure dose as claimed in Claim 9, wherein:

said resist sensitivity changes correspond to a step change function from an old resist sensitivity to a new resist sensitivity; and,

said means for calculating a ~~said~~ batch factor calculates ~~further comprises calculating~~ a batch factor of said exposure dose ratio of 1 for all lots run subsequent to said step change function.

12. (Currently Amended) The system for controlling exposure dose as claimed in Claim 9, further comprising:

- a) means for obtaining said calculated batch factor for a lot run prior to an initial of said resist sensitivity changes;
- b) means for obtaining said calculated batch factor for a most recent previous lot run;
- c) means for calculating a mixing factor for a previous lot run ~~mixing factor~~ for modeling said resist sensitivity changes of said previous run lot due to flow characteristics of said resist;
- d.) means for calculating a mixing factor for a next lot run ~~mixing factor~~ for modeling said resist sensitivity changes of said next lot run due to said flow characteristics of said resist;
- e) means for calculating said calculated batch factor for a new lot, ~~wherein said calculating means uses~~ run using the calculated batch factors of step a) and step b), and the calculated mixing factors of step c) and step d);

- f) means for calculating said value of said exposure dose based on said historical data and said calculated batch factor for said new lot run.

13. (Currently Amended) The system for controlling exposure dose as claimed in Claim 9, wherein:

a means for applying an aging factor₁ to compensate for an ambient temperature of said resist, ~~is applied~~ to said calculated batch factor to increase accuracy of said calculated batch factor;

~~said~~ means for applying said aging factor₁ to compensate for said ambient temperature of said resist, ~~is applied~~ to said value of said exposure dose to increase accuracy of said calculating a value of said exposure dose ~~value~~.

14. (Currently Amended) A computer program product comprising:

a computer usable medium having computer readable program code embodied therein for controlling exposure dose in a lithographic exposure tool for exposing a photoresist material applied to semiconductor wafers, and a reticle develops images in the photoresist material applied to the semiconductor wafers, and wherein the photoresist material is subject to batch changeover and the system operates with successive lot runs including previous lot runs that were run prior in time and a current lot run that is currently being run, the computer readable program code in said computer program product comprising:

- a) first computer readable program code for causing the computer to calculate a batch factor that is an exposure dose ratio of current exposure dose performance to previous exposure dose performance by using historical data₁ comprising batch factors and optimum exposure doses from at least one previous lot run ~~previous to a~~ that was run prior in time to the current lot run;

- b) second computer readable program code for causing the computer to adjust said exposure dose wherein said adjustment comprises calculating a value of said exposure dose based on said calculated batch factor whereby said exposure dose in said lithographic exposure tool is controlled.

15. (Original) The computer program product for controlling exposure dose as claimed in Claim 14, wherein said second computer readable program code further comprises third computer readable program code for causing the computer to use said optimum exposure doses from said historical data.

16. (Currently Amended) The computer program product for controlling exposure dose as claimed in Claim 14, wherein said resist sensitivity changes correspond to a step function from an old resist sensitivity to a new resist sensitivity; and,

said first computer readable program code for causing the computer to calculate a batch factor further comprises fourth computer readable program code for causing the computer to calculate a batch factor of said exposure dose ratio of 1 for all lots run subsequent to said step function.

17. (Currently Amended) The computer program product for controlling exposure dose as claimed in Claim 14, further comprising fifth computer readable program code for causing the computer to:

- a) obtain said calculated batch factor for a lot run prior to an initial of said resist sensitivity changes;
- b) obtain said calculated batch factor for a most recent previous lot run;

- c) calculate a mixing factor for a previous lot run ~~mixing factor~~ for modeling said resist sensitivity changes of said previous lot run due to flow characteristics of said resist;
- d) calculate a mixing factor for a next lot run ~~mixing factor~~ for modeling said resist sensitivity changes of said next lot run due to said flow characteristics of said resist;
- e) calculate said calculated batch factor for a new lot, ~~wherein said calculation uses run~~ using the calculated batch factors of step a) and step b), and the calculated mixing factors of step c) and step d);
- f) calculate said value of said exposure dose based on said historical data and said calculated batch factor for said new lot run.

18. (Currently Amended) The computer program product for controlling exposure dose as claimed in Claim 14, further comprising sixth computer readable program code for causing the computer to:

apply an aging factor₁ to compensate for an ambient temperature of said resist₁ to said calculated batch factor wherein increased accuracy of said calculated batch factor is achieved;

apply said aging factor₁ to compensate for said ambient temperature of said resist₁ to said value of said exposure dose to increase accuracy of said exposure dose value.

19. (Currently Amended) A system for controlling a process parameter value for a material used in a process and having a batch factor which is a ratio of current material performance to previous material performance, and wherein the material is subject to batch changeover, and the system operates with successive lot runs including previous lot

runs that were run prior in time and a current lot run that is currently being run,
comprising:

means for adjusting said process parameter value as a function of material performance
property changes, further comprising;

- a) means for calculating a batch factor that is a ratio of current material performance to previous material performance by using historical data, comprising batch factors and an optimum of said process parameter value from at least one previous lot run ~~previous to a~~ that was run prior in time to the current lot run;
- b) said means for adjusting said process parameter value comprises calculating said process parameter value based on said calculated batch factor whereby said process parameter value is controlled.